

Influenza

Agent: Influenza virus; Types A, B and (rarely) C cause human disease.

Mode of Transmission: Directly from person-to-person, primarily through inhalation of droplets released through coughing or sneezing. Less commonly, the influenza virus can be transmitted by contact with a contaminated object or surface and then touching one's mouth or nose.

Signs/Symptoms: Fever, headache, muscle pain, fatigue, sore throat and cough. Children may also have gastrointestinal symptoms, such as nausea, vomiting, or diarrhea. Complications of influenza can include lower respiratory tract involvement (e.g., bronchitis), viral or bacterial pneumonia, ear infections, sinus infections, dehydration, and worsening of chronic medical conditions, such as congestive heart failure, asthma, or diabetes.

Prevention: Annual vaccination is the primary prevention strategy; antiviral medications are supplemental to vaccine and may be used to prevent illness or lessen illness severity. Transmission may be reduced by washing hands frequently or using alcohol-based hand-sanitizers; avoiding touching the eyes, nose, and mouth with contaminated hands; and covering the nose and mouth with a tissue or the bend of the elbow when coughing or sneezing. Persons who are sick with influenza symptoms are encouraged to stay home to avoid spreading the disease to others.

Other Important Information: The influenza virus changes slightly from year to year (antigenic drift), making it necessary to prepare a new vaccine each year. Periodically, the virus will change to form a completely new subtype (antigenic shift), which can lead to pandemics.

Influenza Surveillance

In Virginia, influenza surveillance is conducted throughout the year. However, efforts are most intensively focused during the period of highest influenza activity, which normally begins in early October (week 40) and ends in late May (week 20). Surveillance efforts in Virginia do not count every individual case of influenza, but instead monitor indicators of illness within the community. For the 2016-2017 influenza season, data sources included visits for influenza-like illness to hospital emergency departments and urgent care centers, confirmed laboratory reports, evaluations of outbreak investigations, influenza-associated pediatric deaths, and school absenteeism. These data sources are used to determine weekly influenza levels, provide insight on the severity of illness, and characterize influenza virus subtypes circulating in the community.

National Overview of 2016-2017 Influenza Season

According to the Centers for Disease Control and Prevention (CDC), during the 2016-2017 influenza season, influenza A (H3N2) viruses predominated. Smaller numbers of influenza A (H1N1) and influenza B viruses were also identified. Compared with past influenza seasons, the 2016-2017 season produced a higher percentage of outpatient visits for influenza-like illness, higher hospitalization rates, and a higher percentage of deaths related to influenza and pneumonia. There were reports of hospitalizations and deaths in young, otherwise healthy individuals who were infected with influenza A (H3N2) viruses and who were not vaccinated. However, severity indicators were within the range that has been observed in previous H3N2-dominant seasons.

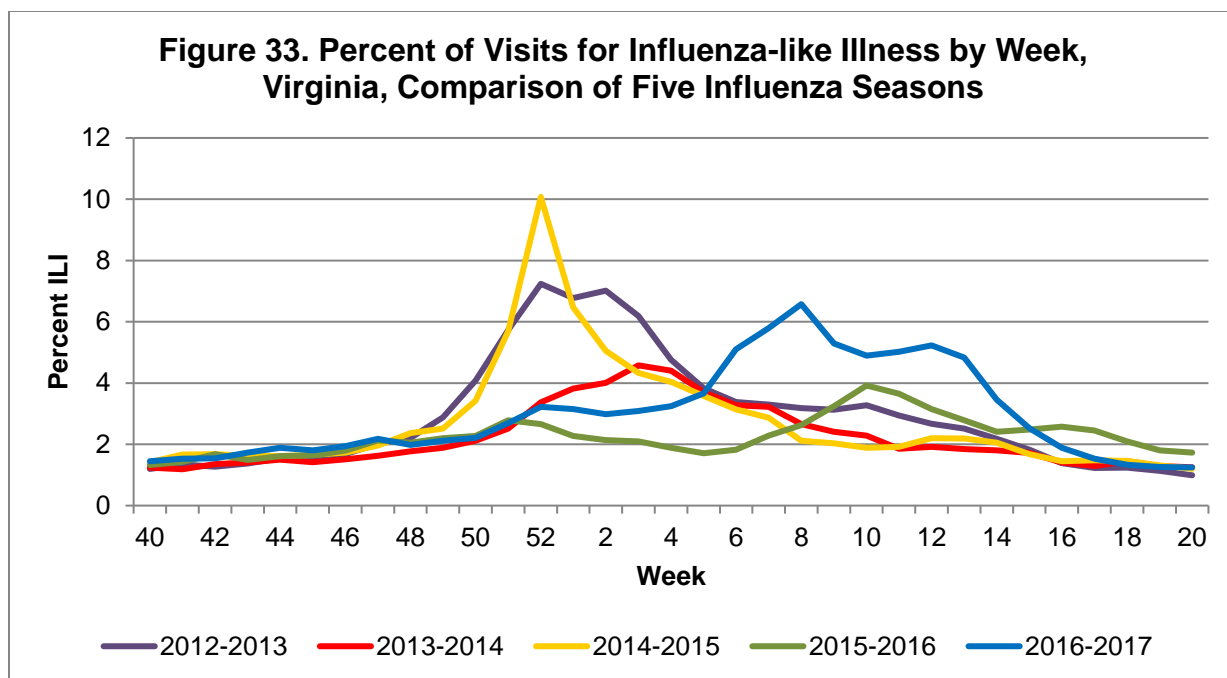
Nationally, of the influenza A (H3N2) viruses tested by the CDC, 95% were antigenically similar to the strain contained in the 2016-2017 influenza vaccine. Further, 99% of the influenza A (H1N1) viruses, 87% of the influenza B (Victoria lineage) viruses, and all of the influenza B (Yamagata lineage) viruses tested by the CDC were antigenically similar to the 2016-2017 vaccine components.

Based on data collected from November 28, 2016 through April 14, 2017, CDC reported overall influenza vaccine effectiveness (VE) of 42%. This means that getting the influenza vaccine reduced the risk of having to see a healthcare provider due to influenza by 42%. More specific VE estimates are as follows: 34% VE against the influenza A (H3N2) viruses that were most predominant during the season and 56% VE against all influenza B viruses. Estimates of VE against influenza A (H1N1) viruses are not available because of the small number of infections with those viruses during the season.

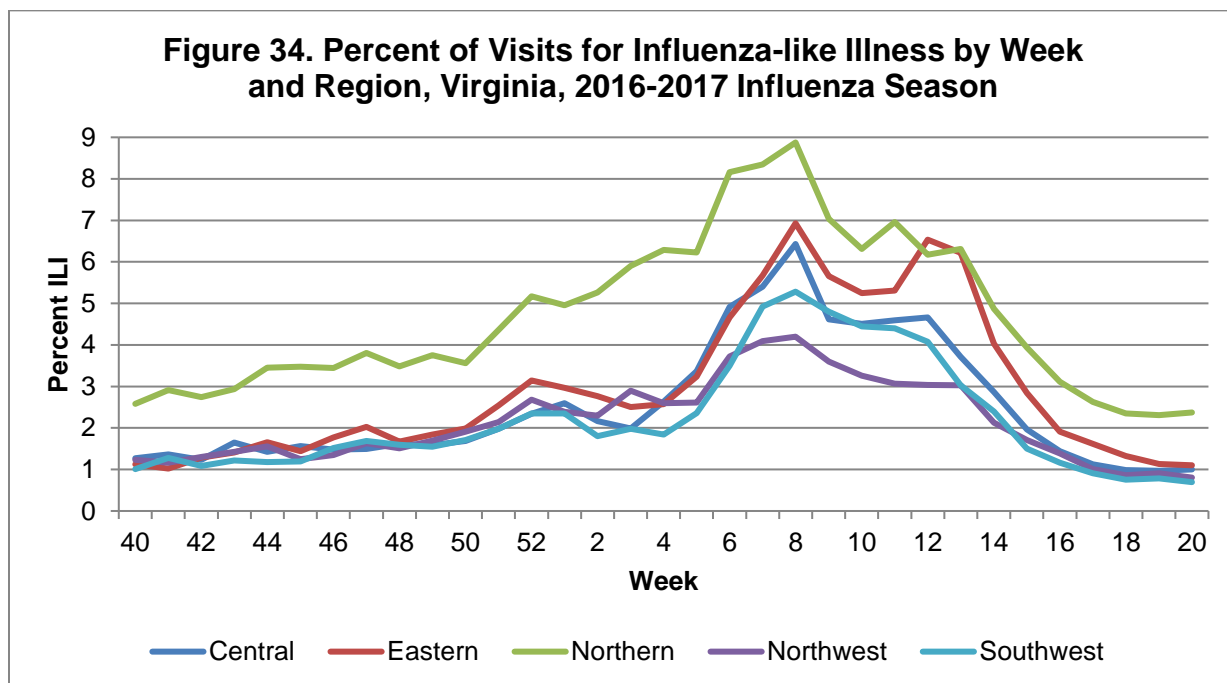
Influenza-like Illness Surveillance

The Virginia Department of Health (VDH) receives information regarding patient visits to emergency departments and urgent care facilities for influenza-like illness (ILI) symptoms. ILI symptoms include a complaint of fever with cough and/or sore throat. Other illnesses may show similar symptoms, but the strategy has proven to be a reliable indicator of influenza activity during flu season. During the 2016-2017 influenza season, 157 emergency departments and urgent care facilities provided data to VDH for surveillance monitoring.

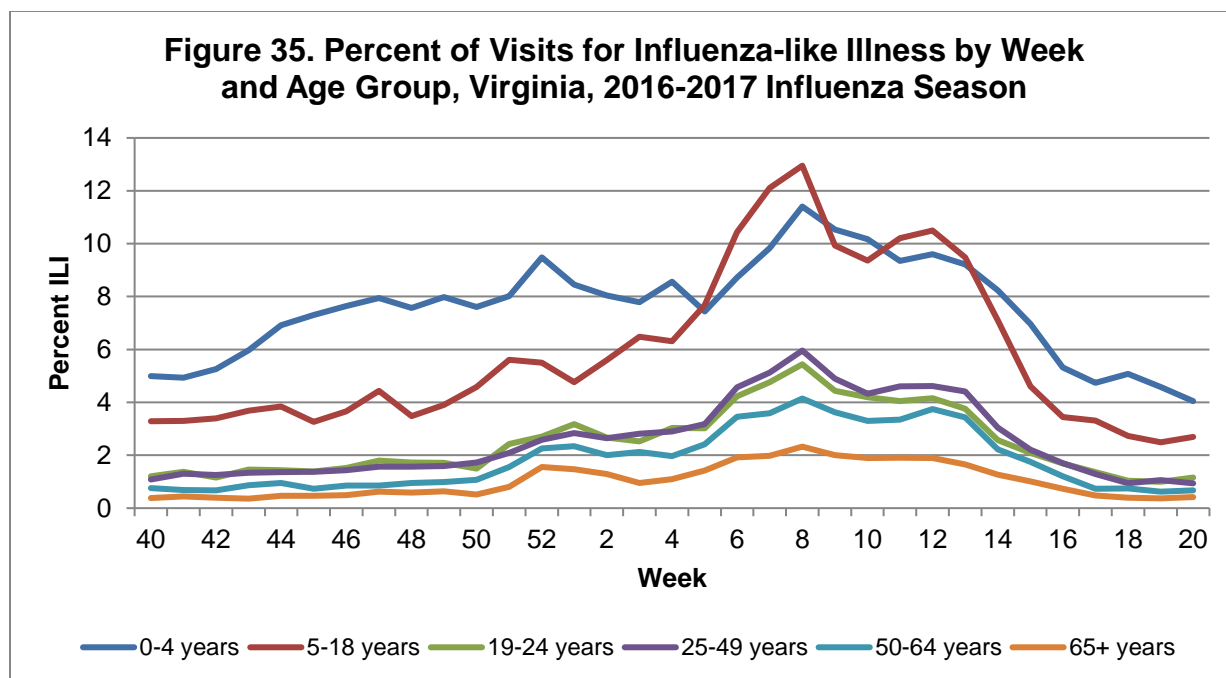
Nationally, the weekly percentage of outpatient visits for ILI to healthcare providers participating in the Outpatient Influenza-Like Illness Surveillance Network (ILINet) was at or above the national baseline level of 2.2% for 17 consecutive weeks during the 2016-2017 influenza season. Across the United States, the peak percentage of outpatient visits for ILI was 5.1%, and occurred in early February (week 6). In Virginia, the proportion of patient visits for ILI during the 2016-2017 season peaked at 6.6%, during week 8 (week ending February 25, 2017) (Figure 33).



ILI activity in each region in Virginia peaked in late February (week 8), with the northern region experiencing the highest proportion of visits for ILI (8.9%) (Figure 34). The peak ILI proportions in the other regions were as follows: eastern region, 6.9%; central region, 6.4%; southwest region, 5.3%; and northwest region, 4.2%.

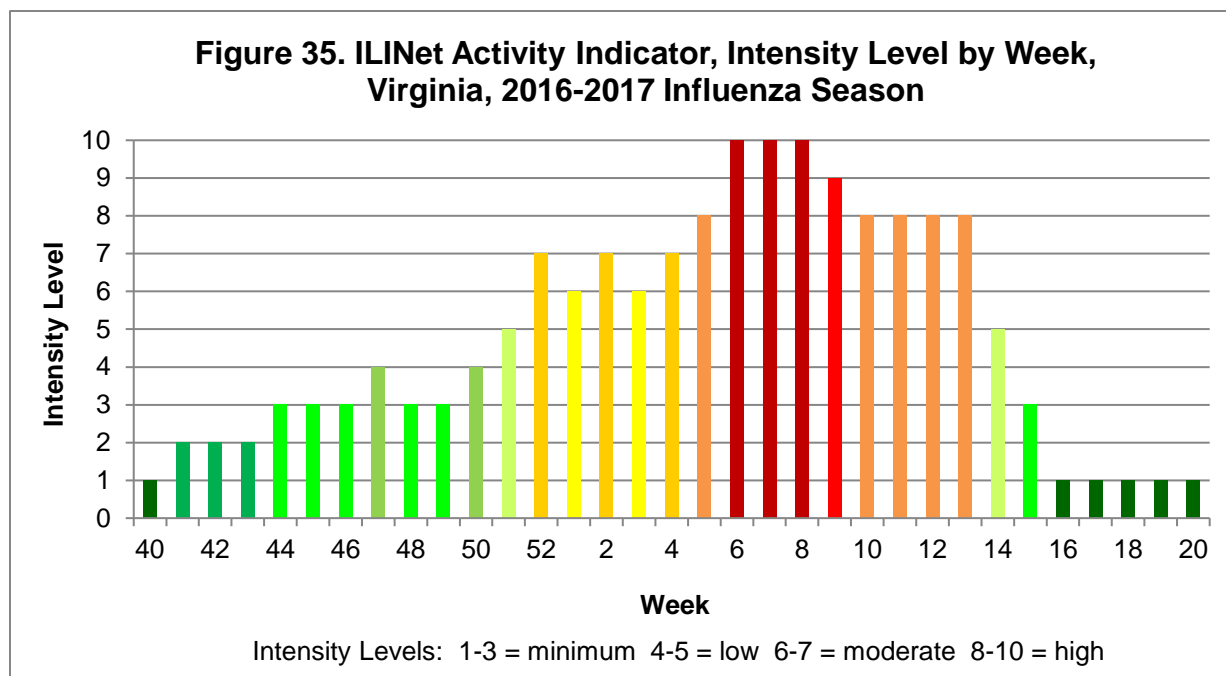


Analyzing ILI activity by age provides additional insight into disease patterns. While influenza vaccination efforts have historically often targeted the elderly because of concerns over complications of infection, the youngest age groups show the largest proportions of healthcare visits to emergency departments and urgent care facilities for ILI. Specifically, the largest proportion of visits due to ILI occurred in the 5-18 year age group during week 8 (13.0%). For the most weeks during the influenza season, the 0-4 age group experienced the largest proportion of visits due to ILI. The smallest proportion of visits for ILI occurred in the 65 years and older age group (Figure 35); it may be that this population seeks healthcare elsewhere.



Influenza Intensity Levels

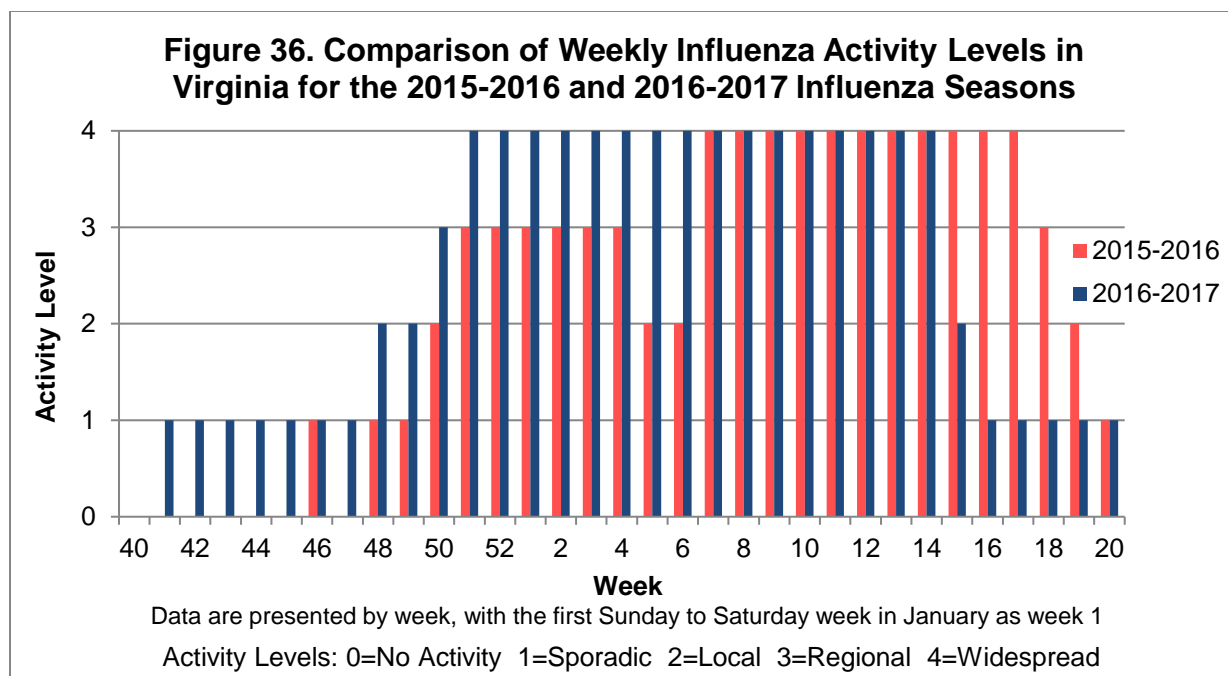
CDC reported weekly influenza intensity levels (ranging from 1 to 10) by state. This measure, first introduced during the 2010-2011 season, is calculated by comparing the percent of patient visits due to ILI for that week to the average proportion of ILI visits that occurred during a designated baseline period for which there is minimal or no influenza virus circulation. During the 2016-2017 season, influenza intensity levels in Virginia gradually increased during the winter, reaching moderate intensity levels in late December (week 52) and peak intensity level in February (weeks 6-8). The level remained relatively high until the beginning of April (week 13), and then gradually decreased to minimal levels. During the previous 2015-2016 season, influenza intensity levels in Virginia slowly increased during the winter, reaching moderate intensity levels in late February and peak intensity level in mid-March (week 10). The level then gradually dropped, rising only slightly before reaching minimal levels. Influenza intensity levels for Virginia for the 2016-2017 season are presented by week in Figure 35.



Influenza Activity Levels

Virginia follows CDC guidelines to describe the geographic distribution of influenza activity. The weekly activity level is based on ILI data, laboratory findings, and outbreak occurrences. The activity level is classified into the following categories: no activity, sporadic, local, regional, or widespread. The levels are not indicators of the severity of influenza illness but instead serve as a gauge for the geographic distribution of influenza activity around the state. Six weeks of ILI data, collected during the summer months of July through September, are used to establish baseline thresholds for the five health planning regions. ILI activity is considered elevated when visits in a region exceed the regional threshold.

The 2016-2017 influenza season began with sporadic activity in October through November, and then jumped to local activity level in early December (week 48). Virginia reached widespread activity in late December (week 51), and remained widespread for 16 consecutive weeks until the beginning of April (Figure 36). The same number of weeks of widespread activity occurred during the 2009-2010 season and was higher than the average of the past five influenza seasons (10 weeks).

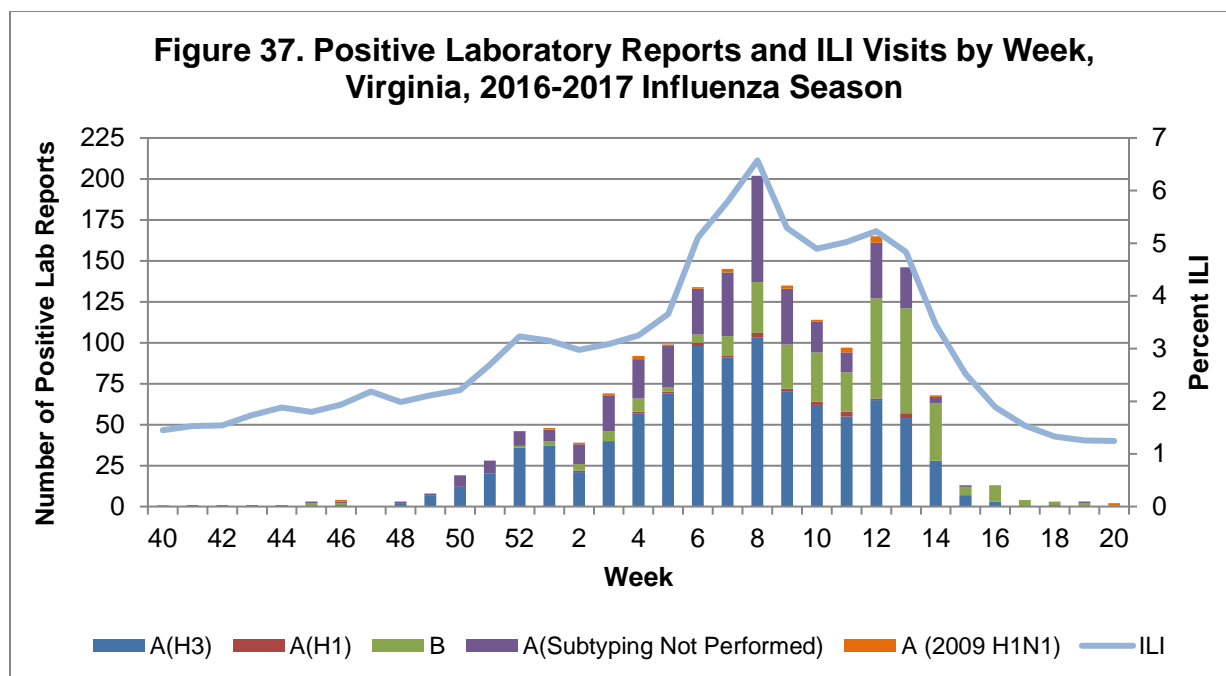


Laboratory Surveillance

Laboratory surveillance for influenza uses findings from three diagnostic testing procedures: DFA (direct fluorescent antibody), PCR (polymerase chain reaction), and viral culture. Rapid antigen tests are not included. Information is obtained from specimens submitted by sentinel providers, specimens obtained during outbreaks, influenza reporting by private laboratories, and laboratory findings from Virginia facilities participating in the National Respiratory and Enteric Viruses Surveillance System (NREVSS).

Sentinel providers include private physicians and medical facilities located throughout Virginia. Statewide representation is achieved through the efforts of health districts to enlist providers from their area. During the influenza season, sentinel providers submit specimens from patients with ILI to the Virginia Division of Consolidated Laboratory Services (DCLS), the state public health laboratory, for analysis. Regular sentinel providers were asked to submit up to five specimens per week from patients exhibiting influenza-like illness.

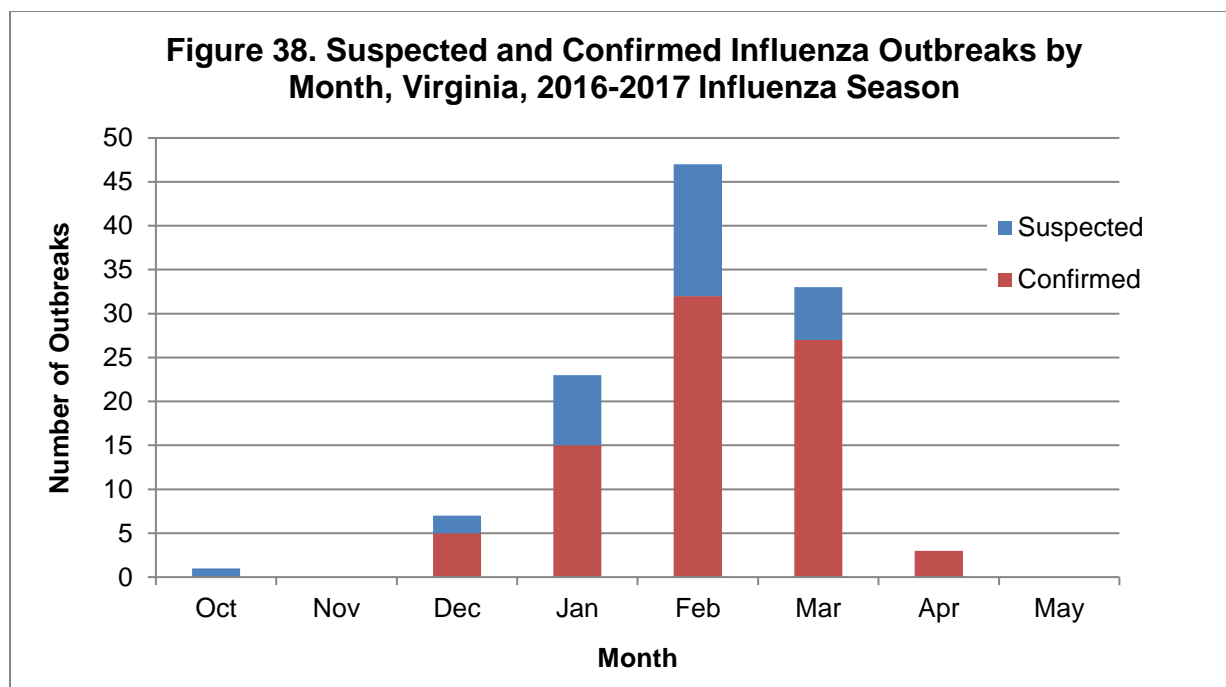
During the 2016-2017 season, influenza A (subtyping not performed), A (H3), A (H1), A (2009 H1N1), and B viruses were all circulating in the state, as shown in Figure 37. Influenza A (H3) viruses predominated during the 2016-2017 influenza season. Laboratory tests indicate that 80% of positive influenza findings were influenza A (all subtypes) and 20% were influenza B. For the 2015-2016 season, 77% of positive influenza findings were influenza A (all subtypes) and 23% were influenza B. As more providers have gained access to quicker, more reliable diagnostic testing methods such as PCR, the volume of confirmatory testing has increased substantially. During the 2016-2017 season, Virginia received 1,708 unique confirmatory influenza laboratory reports.



Influenza Outbreaks

During the 2016-2017 season, 114 influenza outbreaks were reported. In comparison, 45 outbreaks of influenza were reported during the 2015-2016 season and 152 reported during the 2014-2015 season. Outbreaks reported by month of occurrence are shown in Figure 38. Specimens from 82 influenza outbreaks tested positive for influenza virus (by rapid test or confirmatory laboratory report), confirming 22 (27%) as influenza A (H3)-associated, 1 (1%) as influenza A (H1)-associated, 36 (44%) as influenza A-associated (not further characterized), 8 (10%) as influenza B-associated, and 15 (18%) as unspecified type. The first confirmed outbreak was reported in late December 2016. During the previous season (2015-2016), the first confirmed outbreak also occurred in late December. During the 2016-2017 season, confirmed influenza outbreaks were reported from 32 nursing homes, 25 assisted living facilities, 14 schools (K-12), 3 daycare/pre-school facilities, 3 medical facilities (not long-term care related), 2 multi-care settings, 2 facilities classified as other, and 1 residential behavioral health facility.

By region, the largest percentage of outbreaks (26%, 30 outbreaks) were reported from the eastern region, followed by the northern region (25%, 28 outbreaks), northwest region (24%, 27 outbreaks), southwest region (13%, 15 outbreaks), and central region (12%, 14 outbreaks). On average, 35 cases were associated with each influenza outbreak, with a range of 2 to 330 cases per outbreak. A total of 126 hospitalizations were associated with these outbreaks.



Influenza-associated Deaths

Virginia disease reporting regulations require physicians and directors of medical care facilities to report suspected or confirmed influenza-associated deaths in children less than 18 years of age to allow monitoring of this severe outcome of influenza illness. Two pediatric influenza-associated deaths were reported during the 2016-2017 influenza season. The deaths occurred in a school age child (5-12 years) from the northwest region and a teenage child (13-17 years) from the eastern region. Influenza A (2009 H1N1) and influenza A (H3) were identified by PCR, respectively. During the 2015-2016 influenza season, one pediatric influenza-associated death was reported in Virginia. Nationally, a total of 101 influenza-associated pediatric deaths were reported during the 2016-2017 season. Of note, Table 2a of this report lists one pediatric influenza-associated death in 2016. The death in Table 2a was reported for calendar year 2016, while the information in this narrative is representative of the 2016-2017 influenza season.

School Absenteeism

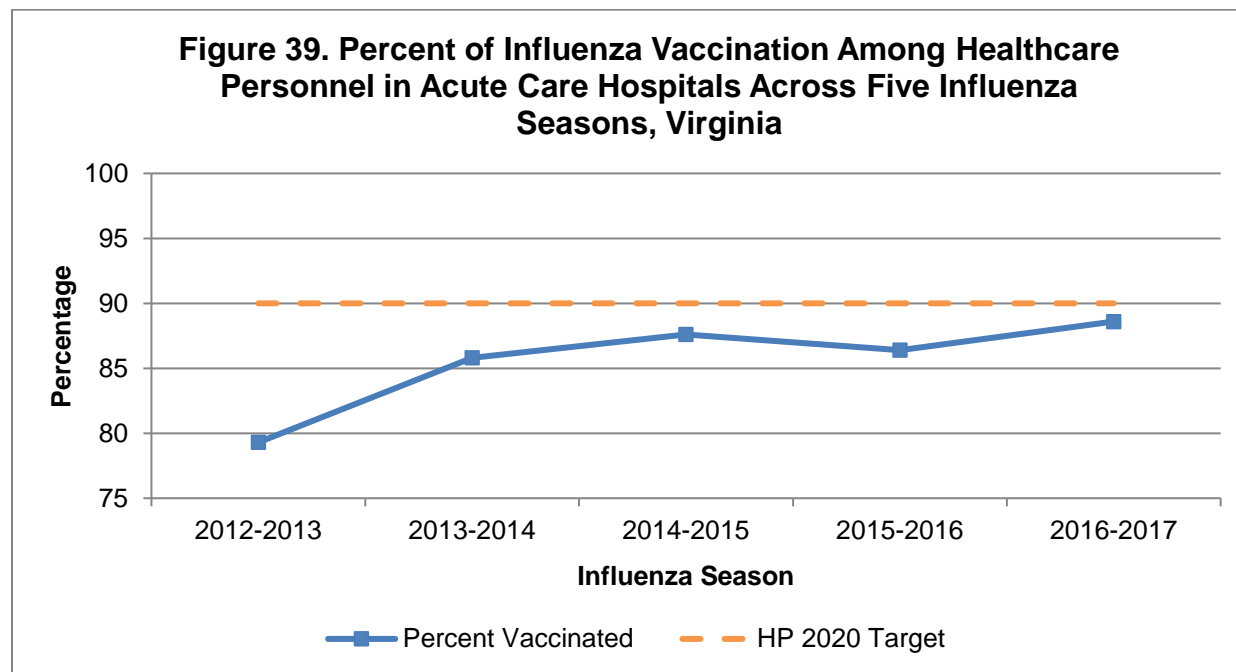
School absenteeism surveillance was added to influenza surveillance in Virginia during the 2009-2010 pandemic season, and continues because of the valuable insights it provides. Information on absenteeism is voluntarily submitted by school divisions and made available to health districts to identify emerging problems and monitor potential influenza activity in their communities. Centrally, it is evaluated by region and school level (elementary, middle, and high school) for unusual patterns. During the 2016-2017 season, school divisions provided absenteeism data for 419 schools, which represented 12 school systems. Although school absenteeism provides a general, but not influenza-specific measure of illness, school absenteeism data are useful for monitoring illness activity and identifying schools with possible outbreaks during the influenza season.

Influenza Vaccination among Healthcare Personnel

The best way to prevent influenza infection is by receiving the influenza vaccine every year. CDC recommends that all healthcare personnel who work in a healthcare setting receive influenza vaccine each year to help prevent the spread of influenza viruses within the workplace. Healthcare personnel include all facility employees, licensed independent practitioners, adult students/trainees, and volunteers regardless of full time/part time status, clinical responsibility or patient contact. Numerous studies have shown that patients benefit when healthcare workers get vaccinated. Many hospitals choose to provide the influenza vaccine to their employees, and some hospitals even have policies requiring mandatory vaccination. Currently, there are no state regulations requiring vaccination of healthcare workers in Virginia, and healthcare workers are able to decline the influenza vaccine.

VDH receives healthcare personnel influenza vaccination summary data from the National Healthcare Safety Network. In accordance with disease reporting regulations, acute care hospitals report the percentage of all healthcare workers in their hospitals who received the flu vaccine for each season. The Department of Health and Human Services (HHS) Healthy People 2020 goal is to have 90% of healthcare personnel vaccinated against seasonal influenza. For the 2016-2017 season, Virginia's overall influenza vaccination percentage was 89%, which is close to but not quite reaching the Healthy People 2020 goal (Figure 39). Of the 78 acute care hospitals reporting vaccination data, 45 hospitals (58%) met this goal for the 2016-2017 season.

For more information on healthcare personnel influenza vaccination, please visit the VDH Healthcare-associated Infections (HAI) Program's website at the following address: <http://www.vdh.virginia.gov/surveillance-and-investigation/hai/hai-surveillance-and-public-reporting/>.



Flu Near You

Flu Near You is an influenza-like illness (ILI) surveillance system that allows members of the public to report their health status anonymously each week through a website or mobile application. Users who report having a fever and any of the following symptoms: cough, sore throat, fatigue, shortness of breath, chills, body aches, headache, diarrhea or nausea are classified as having an ILI syndrome. Flu Near You then analyzes these reports and maps them to provide local and national views of self-reported influenza activity. This information empowers people to get engaged in public health and take steps to protect their health, such as finding nearby locations that offer influenza vaccines and connecting with local public health resources.

For the 2016-2017 influenza season, VDH partnered with the Council of State and Territorial Epidemiologists (CSTE) and the Skoll Global Threats Fund (SGTF) to promote Flu Near You and assess how self-reported ILI data from Flu Near You compared with data from current VDH influenza surveillance systems. Assessing how Flu Near You data reported in Virginia correlates to VDH data could potentially give local health departments another important tool to monitor influenza activity in their communities. The graph below (Figure 40) shows similar overall trends in the percent of ILI for Flu Near You, VDH, and CDC's ILINet data. Flu Near You and VDH data showed that the percent ILI peaked during week 8, and CDC's ILINet data showed the peak during week 6. These findings indicate that Flu Near You could be a useful tool to supplement traditional influenza surveillance in Virginia.

